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EXAMINER

CARROLL, J

ART UNIT	PAPER NUMBER
2508	22

DATE MAILED:

01/08/97

This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

- ☐ This application has been examined. ☒ Responsive to communication filed on 03 October 1996. ☒ This action is made final.
- A shortened statutory period for response to this action is set to expire THREE (3) month(s), 0 days from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited by Examiner, PTO-892.        | 2. <input type="checkbox"/> Notice re Patent Drawing, PTO-948.                   |
| 3. <input checked="" type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449.  | 4. <input type="checkbox"/> Notice of informal Patent Application, Form PTO-152. |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474. | 6. <input type="checkbox"/> _____  |

Part II SUMMARY OF ACTION

1. ☒ Claim(s) 17 through 42, 44 and 46 through 65 are pending in the application.  
Of the above, claim(s) \_\_\_\_\_ are withdrawn from consideration.
2. ☒ Claim(s) 1 through 16, 43, 45 and 66 have been canceled.
3. ☐ Claim(s) \_\_\_\_\_ are allowed.
4. ☒ Claim(s) 17 through 42, 44 and 46 through 65 are rejected.
5. ☐ Claim(s) \_\_\_\_\_ are objected to.
6. ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.
7. ☐ This application has been filed with informal drawing(s) under 37 C.F.R. 1.85 which are acceptable for examination purposes.
8. ☐ Formal drawing(s) are required in response to this Office action.
9. ☐ The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable. ☐ not acceptable (see explanation or Notice re Patent Drawing, PTO-948).
10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_ has (have) been ☐ approved by the examiner. ☐ disapproved by the examiner (see explanation).
11. ☐ The proposed drawing correction(s), filed on \_\_\_\_\_, has been ☐ approved. ☐ disapproved (see explanation).
12. ☐ Acknowledgment is made of the claim for priority under 35 USC 119. The certified copy has ☐ been received ☐ not been received  
☐ been filed in parent application, serial no. \_\_\_\_\_; filed on \_\_\_\_\_.
13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.
14. ☐ Other

EXAMINER'S ACTION

We have entered as Paper No. 20 the AMENDMENT filed 03 October 1996.

Due to the amendment we withdraw the objection under 37 C.F.R. 1.83(a) and Claim rejections under 35 U.S.C. 112 as expressed in Paper No. 17.

We newly object to the Figures under 37 C.F.R. 1.83(a) because they do not show every feature of the subject matter required by twice amended Claim 30 that particularly requires a layer of oxide positioned within the trench and contiguous to the bottom walls and side walls of the trench so that portions, "but not all," of the trench is filled with the oxide layer. Device illustrations, *i.e.*, Figures 4, 8, 30A, 30B, 31A and 31B, instead show substantially all of the trench filled with gate oxide layer (35). In response we therefore require either a showing in the Figures of the subject matter required by twice amended Claim 30, as excerpted *supra*, but without the introduction of new matter prohibited under 35 U.S.C. 132, or we require deletion of the excerpt *supra* from the claimed subject matter.

In consideration of the REMARKS on amendment pages 3 through 8 we express the following observations and opinions.

On amendment page 5 the Applicants excerpted our position as expressed in the last two paragraphs from page 2 of Paper No. 17 wherein we referred to the information disclosed by Tonnel in the paragraph spanning columns 5 and 6 to support our conclusion of obviousness within the meaning of 35 U.S.C. 103 as based on the combination with Ueda *et al.* On amendment page 6 the Applicants disagreed with our position and excerpted a pertinent portion of the information disclosed by Tonnel in the paragraph, cited *supra*. The Applicants subsequently but incongruously alleged that we "merely" relied upon Figures 3, 12 and 19 of Tonnel as "fortuitously" showing the claimed depth relationships.

Among other things, in response, we are unable to understand the Applicants' fortuitous characterization. From the Applicants point of view, how fortuitous can it be not to possess another US Patent claiming unobvious subject matter based upon the originally filed disclosure due to the Tonnel prior art? From our point of view, we found no fortune in searching for and first applying Tonnel in June 1994, Paper No. 8, and yet, in 1997, unsuccessfully convincing the Applicants that the presently

claimed combination was evidently envisaged by Tonnel. Further, we have considered the Tonnel disclosure as a whole, not merely Figures 3, 12 and 19 as alleged. We provided a more careful analysis of Tonnel in Paper No. 12 wherein, on pages 4 and 5, we found that Figures 4 through 12, combined with the corresponding written disclosure, plausibly demonstrated that deep base regions (22), first introduced in the process step of Figure 4, plausibly grew deeper during the thermal oxidation step of Figure 5, at about the same depth as grooves (30) of Figure 6, and plausibly grew still further deeper than the depth of the grooves during ion implantation and annealing steps subsequently performed in the process steps of Figures 9 and 10, to yield a device shown with Figure 12 that obviously possesses all the claimed characteristics. The Applicants have provided no meaningful counter-analysis from which we could plausibly conclude that our analysis was essentially incorrect.

Further on amendment page 6 the Applicants contended that Tonnel provided no verbal description relative to the claimed depth relationships, notwithstanding the fact that we have demonstrated that Tonnel provided ample verbal description of the process of manufacture of a device that obviously possesses all the presently claimed characteristics.

Unable to discern a reasonable basis to conclude that the presently claimed subject matter is patentable, we maintain the following Claim rejections.

We reject Claims 17 through 22, Claims 24 through 37, Claim 44, Claims 46 through 49, Claims 51 through 58, and Claims 64 and 65 under 35 U.S.C. 103 as unpatentable over considerations of Tonnel and Ueda *et al.*, as discussed *supra* and in the record.

We reject Claim 50 under 35 U.S.C. 103 as unpatentable over considerations of Tonnel, Ueda *et al.* and Lisiak *et al.*, as discussed *supra* and in the record.

We reject Claims 39, 40, 41, 60, 61 and 62 under 35 U.S.C. 103 as unpatentable over considerations of Tonnel, Ueda *et al.* and Yamabe *et al.*, as discussed *supra* and in the record.

We reject Claims 17 through 42, Claim 44 and Claims 46 through 65 under the judicially established doctrine of obviousness-type double patenting as unpatentable over Patent Claim 2 and its dependent Claims in US 5,072,266, but further considered with Tonnel, Lisiak *et al.*, Ueda *et al.* and Yamabe *et al.* teaching that the differences between the claimed subject matters would have been obvious, as discussed *supra* and in the record.

Due to the amendment we extend onto new grounds the following Claim rejections.

We reject Claims 30, 31, 55, 56, 57, 58 and 59 under the second paragraph of 35 U.S.C. 112. Twice amended Claim 30 is vague and indefinite because there is no antecedent basis for "the heavily doped portion of the second covering layer," newly recited on the last two Claim lines. Claim 31 is vague and indefinite because of its dependency upon vague and indefinite Claim 30, discussed *supra*. There is an inadequate basis in the foregoing disclosure for the combination as presently required by Claim 55 due to Claim 54 as presently amended. More particularly, presently amended Claim 54 newly requires "a semiconductor substrate" and Claim 55 requires the construct, as set forth in Claim 54, as "further comprising a substrate of a first conductivity type." We discern that the foregoing disclosure does not adequately support Claim 55 that scopes out a construct possessing not only the semiconductor substrate of Claim 54, but further possessing another substrate having a first conductivity. Thus, Claim 55 and Claims 56 and 57, dependent therefrom, are not adequately supported by the foregoing disclosure. Amended Claim 58 is vague and indefinite because there are no antecedent bases for the newly presented "the epitaxial layer" and "the top surface of the epitaxial layer," as readily discerned from each of amended Claims 54 and 58 presented on amendment page 3. Claim 59 is vague and indefinite due to its dependency upon vague and indefinite Claim 58, discussed *supra*.

We reject vague and indefinite Claims 55, 56 and 57 under the first paragraph of 35 U.S.C. 112 for requiring a construct that includes two substrates, as discussed *supra*. Not discerning a reasonable basis in the foregoing disclosure that would indicate that the Applicants possessed the claimed construct that includes two substrates at the time the Invention was made, we conclude that the claimed

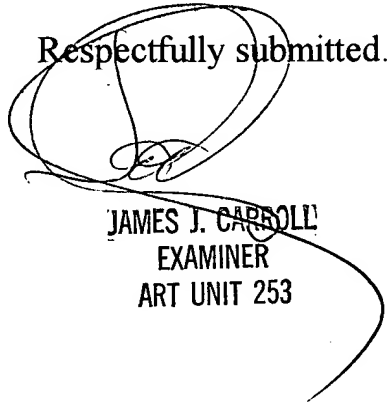
construct constitutes new matter not originally disclosed, as expressly prohibited under 35 U.S.C. 132.

We again reject all Claims.

We make final the present USPTO action.

An inquiry concerning this communication may be directed to Examiner J. Carroll at telephone number 703-308-4926 or, to the Reception Person for Group 2500 at telephone number 703-308-0956. Written communications may be received in Art Unit 2508 at FAX number 703-308-7723.

Respectfully submitted.



JAMES J. CARROLL  
EXAMINER  
ART UNIT 253